

DRAFT

60665

Vesicular glass with Anorthosite clast

90.1 grams

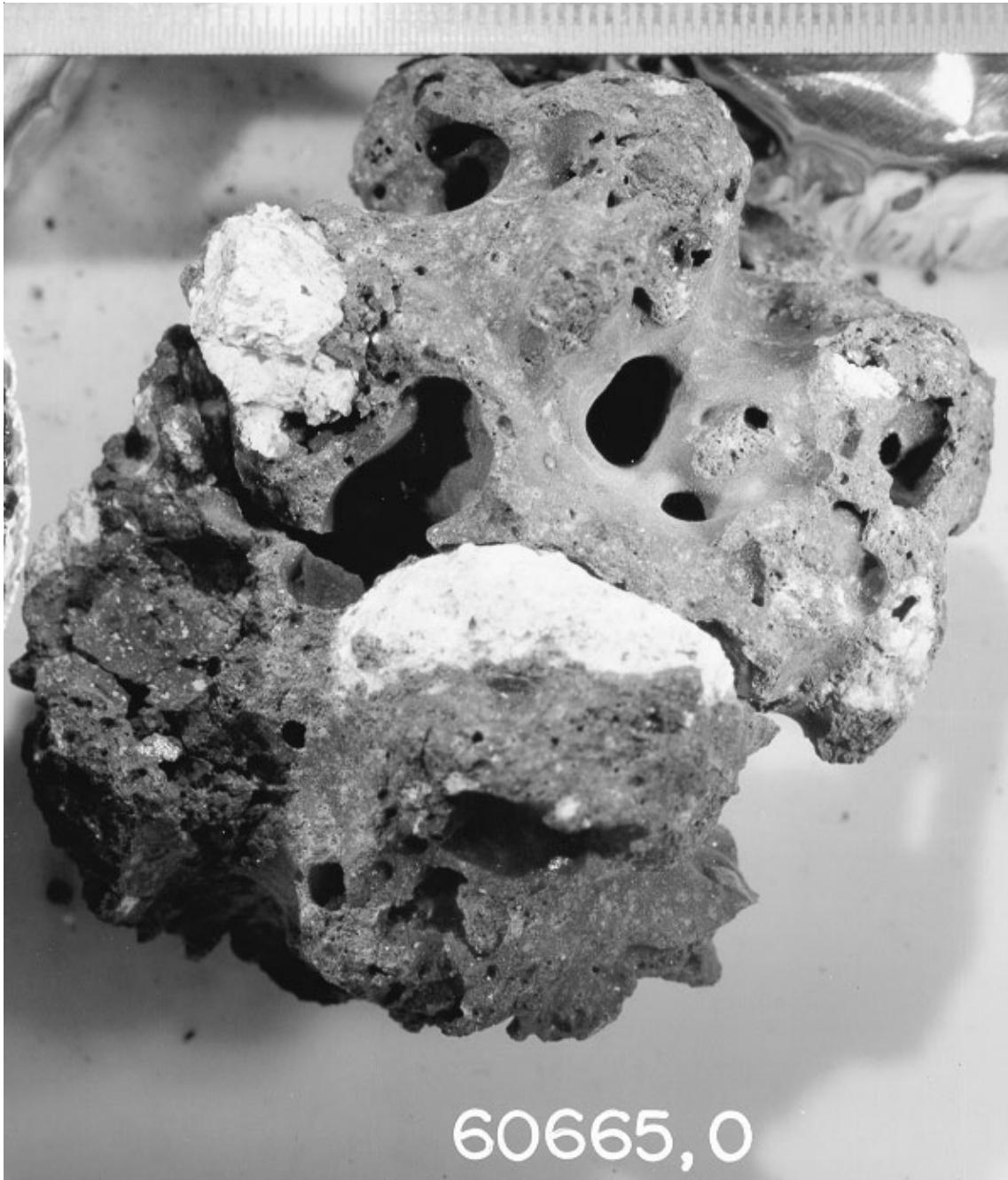


Figure 1: Chalky white clasts in rake sample 60665. NASA S80-26191. Scale bar at top is in mm/cm.

Introduction

60665 is a rake sample from the regolith near the Lunar Module. It contains chalky white clasts loosely held by black vesicular glass (figure 1), one of which has been thin sectioned (figure 2).

Petrography

Dowty et al. (1974a) and Warner et al. (1976b) describe the white clast in 60665. It is a cataclastic anorthosite of the ferroan type based on the plagioclase and

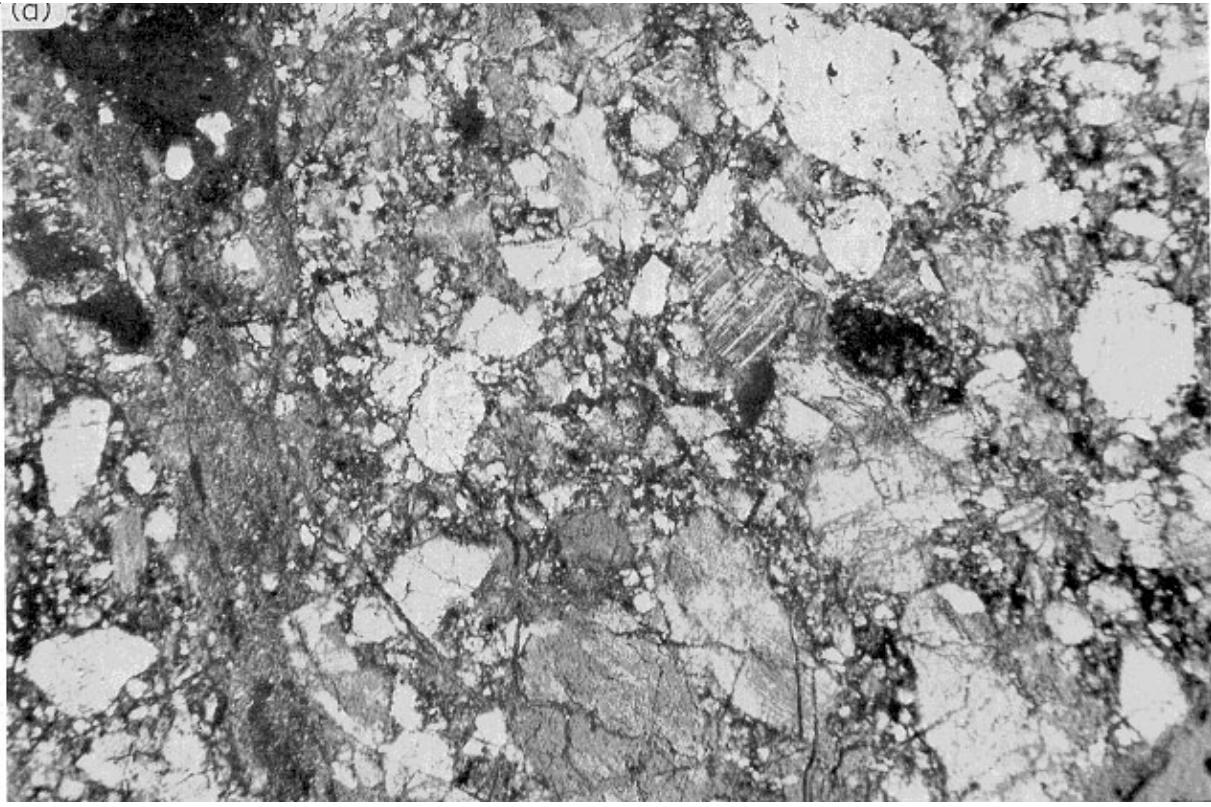


Figure 2: Thin section photomicrograph for 60665 (from Dowty et al. 1974). Width of photo is 4 mm.

pyroxene composition (figure 4). The CIPW norm calculation indicates it is about 97 % plagioclase and ~2% pyroxene. Trace amount of olivine, ilmenite and chromite are reported (Dowty et al. 1974a).

Mineralogy

Olivine: Olivine in 60665 is iron rich (Fo_{62-68}).

Pyroxene: Dowty et al. (1974a) plotted the pyroxene analyses (figure 3).

Plagioclase: Hansen et al. (1979) reported the minor element composition of plagioclase ($\text{An}_{96.4}$).

Ilmenite: Ilmenite in 60665 has 2.4% MgO.

Chromite: Chromite in 60665 has 2.4% TiO_2 , 1-3% MgO and 11-13% Al_2O_3 .

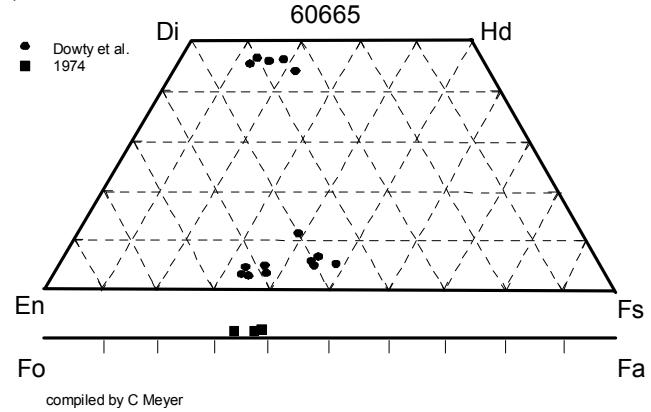


Figure 3 : Pyroxene and olivine composition of 60665 (from Dowty et al. 1974a).

Radiogenic age dating

Not available

Chemistry

The glass was analyzed as part of a study of many glass particles at Apollo 16 (See et al. 1986, Morris et al. 1986). The anorthosite clast has been analyzed by broad beam electron probe only (table 1).

Table 1. Chemical composition of 60665.

	anorthosite	glass
reference	Dowty 74a	Morris 86
weight	Warner 76	See 86
SiO ₂ %	44.6	(a) 45.47 (c)
TiO ₂	0.01	(a) 0.46 (c)
Al ₂ O ₃	35.1	(a) 26.13 (c)
FeO	0.4	(a) 5.62 (c)
MnO	0.01	(a)
MgO	0.26	(a) 7.01 (c)
CaO	19.1	(a) 14.9 (c)
Na ₂ O	0.46	(a) 0.52 (c)
K ₂ O	0.03	(a) 0.56 (c)
P ₂ O ₅	0.02	(a) 0.14 (c)
S %		
sum		
Sc ppm		6.52 (b)
V		
Cr		781 (b)
Co		51 (b)
Ni		843 (b)
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		
Sr		
Y		
Zr		
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba	149	(b)
La	13.1	(b)
Ce	35.5	(b)
Pr		
Nd		
Sm	5.82	(b)
Eu	1.12	(b)
Gd		
Tb	1.04	(b)
Dy		
Ho		
Er		
Tm		
Yb	3.79	(b)
Lu	0.55	(b)
Hf	4.12	(b)
Ta	0.45	(b)
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm	1.63	(b)
U ppm	0.58	(b)

technique: (a) broad beam elec. Probe, (b) INAA, (c) elec. Probe

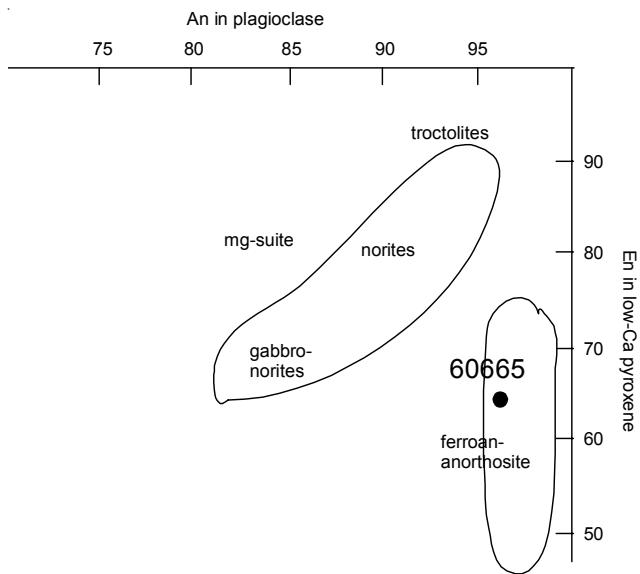


Figure 4: Composition of plagioclase and pyroxene in 60665 anorthosite.

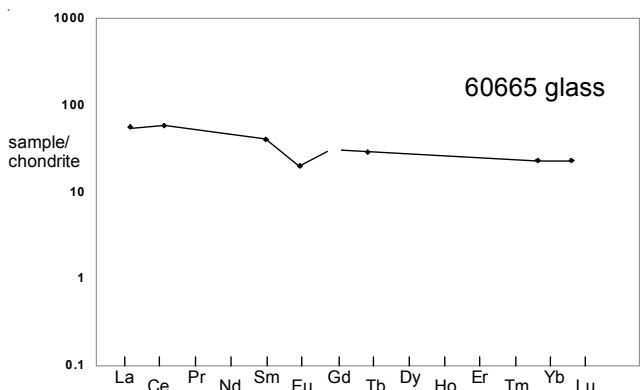


Figure 5: Noramlized rare-earth-element diagram for 60665 (data from Morris et al. 1986).

